

# Southwestern Dwarf Mistletoe

Infects ponderosa pine in Colorado

**Pathogen**—Aerial shoots of southwestern dwarf mistletoe (*Arceuthobium vaginatum* ssp. *cryptopodum*) vary in color from orange to reddish brown to almost black. Shoots are the largest of dwarf mistletoes in this Region and are approximately 4 inches (10 cm) long (maximum 11 inches or 27 cm) with a basal diameter of 1/13-3/8 inch (2-10 mm) (fig. 1). This species is unusual among dwarf mistletoes in temperate regions in that seed germination occurs immediately after dispersal in the fall rather than in the following year. Within the Rocky Mountain Region, southwestern dwarf mistletoe is found in southern Colorado on the Western Slope extending into northern Colorado on the Front Range (fig. 2). No dwarf mistletoe occurs in the Black Hills National Forest, where ponderosa pine is most productive in the Region.



Figure 1. Male southwestern dwarf mistletoe plant parasitizing Rocky Mountain ponderosa pine. Photo: Brian Howell, USDA Forest Service.

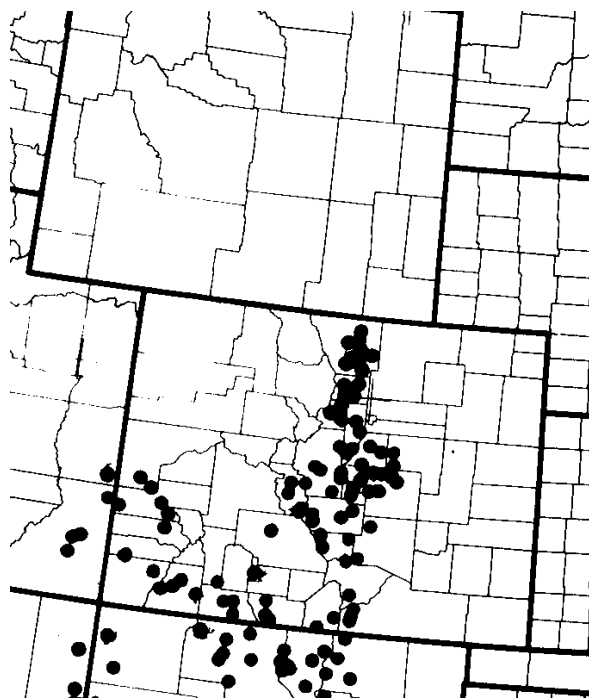


Figure 2. Distribution of southwestern dwarf mistletoe in the Rocky Mountain Region (from Hawksworth and Wiens 1996).

**Hosts**—Southwestern dwarf mistletoe primarily infects the Rocky Mountain variety of ponderosa pine in the Four Corners states (Colorado, Utah, Arizona, and New Mexico) with a small distribution in west Texas. Occasionally, southwestern dwarf mistletoe will infect bristlecone pine and lodgepole pine. It rarely infects limber pine, southwestern white pine, and blue spruce.

**Signs and Symptoms**—Signs of infection include aerial shoots and basal cups, and symptoms include witches' brooms, swelling of infected branches, and dieback (fig. 3).



Figure 3. Heavily infected southwestern ponderosa pine with characteristic broomed branches and top dieback. Photo: Brian Howell, USDA Forest Service.

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**Impact**—Damage is usually greater along the Front Range than in southwestern Colorado. Witches' broom development can be weak, but large and robust brooms with thick, distorted branches are common in older infections. Mortality from southwestern dwarf mistletoe was quantified in a 32-year study at Grand Canyon National Park. Ninety percent of uninfected or lightly infected (DMR 0-1 at the start) trees survived the entire study period. Of heavily infected trees (DMR 6), only 5% over 9 inches (23 cm) diameter at breast height (DBH) survived, and none survived in the 4-9 inches (10-23 cm) size class. Intermediate infection levels were associated with intermediate mortality levels. Infection intensified during the study, so much so that most trees that died were in DMR class 6 by the time of death. Based on the data, the authors estimated the half-life of trees (time in which half the trees are expected to die) by DMR class, as described in table 1.

Estimates of spread rate in single-storied stands vary. Recent estimates of 2-3 ft (61-91 cm) per year indicate that southwestern dwarf mistletoe has one of the faster spread rates. Earlier estimates were about 1.3 ft (0.4 m) per year in open stands and 0.9 ft (0.3 m) per year in dense stands. Spread from overstory to understory is faster in ponderosa than in lodgepole pine.

Please see the Introduction to Dwarf Mistletoes entry for disease cycle and management information.

**Table 1.** Expected half-life (time, in years, for half the trees to die) of ponderosa pine infected with southwestern dwarf mistletoe at Grand Canyon National Park (ref. 3).

Initial DMR	4-9 inches DBH	>9 inches DBH
0-1	ND <sup>a</sup>	ND <sup>a</sup>
2-3	30	57
4-5	17	25
6	7	10
<b>Total</b>		14

<sup>a</sup> No decrease in longevity detected; half-life too long to estimate.

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1. Beatty, J.S.; Mathiasen, R.L. 2003. Dwarf mistletoes of ponderosa pine. Forest Insect and Disease Leaflet 40. Washington, DC: U.S. Department of Agriculture, Forest Service. 8 p. Online: <http://www.fs.fed.us/r6/nr/fid/fidls/fidl40.htm>.
  2. Hawksworth, F.G. 1961. Dwarf mistletoe of ponderosa pine in the Southwest. Tech. Bull. No. 1246. Washington, DC: U.S. Department of Agriculture, Forest Service. 112 p.
  3. Hawksworth, F.G.; Geils, B.W. 1990. How long do mistletoe-infected ponderosa pines live? Western Journal of Applied Forestry 5(2):47-48.
  4. Hawksworth, F.G.; Wiens, D. 1996. Dwarf mistletoes: biology, pathology and systematics. Agricultural Handbook 709. Washington, DC: U.S. Department of Agriculture, Forest Service. 410 p.
  5. Lightle, P.C.; Weiss, M.J. 1974. Dwarf mistletoe of ponderosa pine in the Southwest. Forest Insect and Disease Leaflet 19. Washington, DC: U.S. Department of Agriculture, Forest Service. 8 p. Online: <http://www.fs.fed.us/r6/nr/fid/fidls/fidl19.htm>.